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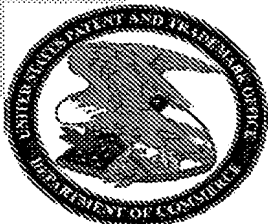
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APPLICATION NUMBER: 60/491,390

FILING DATE: July 31, 2003

RELATED PCT APPLICATION NUMBER: PCT/US04/24365

Certified by



Jon W Dudas

Acting Under Secretary of Commerce
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PTO/SB/16 (05-03)

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

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INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Edward	Spellman	Grafton, OH

Additional inventors are being named on the _____ separately numbered sheets attached hereto

TITLE OF THE INVENTION (500 characters max)

VEHICLE SEAT MOUNT EQUIPMENT RACK

Direct all correspondence to:

CORRESPONDENCE ADDRESS



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37053



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PATENT TRADEMARK OFFICE

OR

Type Customer Number here



Firm or
Individual Name

Address

Address

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ENCLOSED APPLICATION PARTS (check all that apply)



Specification Number of Pages

14



CD(s), Number



Drawing(s) Number of Sheets



Other (specify)



Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT



Applicant claims small entity status. See 37 CFR 1.27.



A check or money order is enclosed to cover the filing fees.



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No.



Yes, the name of the U.S. Government agency and the Government contract number are:

[Page 1 of 2]

Respectfully submitted,

SIGNATURE

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Date

7/31/03

REGISTRATION NO.

(If appropriate)

Docket Number:

47,963

ES-101 prv

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

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PROVISIONAL APPLICATION FOR PATENT

SPECIFICATION

14 pages including annotated drawings

Docket : ES-101 prv
Title : **Vehicle Seat Mount Equipment Rack**
Inventor : Edward Spellman
Agent : Dwight A. Stauffer

The present application comprises copies of lab book notes from the inventor's development of the invention (some copied pages having further annotations according to the inventor), several drawings/sketches produced under the inventor's direction, and additional description according to the inventor (the present document).

The drawings include:

- page labeled (1) = a top view of the rack including transparent views of the hook bars and spring within the tube that is mounted under the shelf,
- page labeled (8) = a detailed drawing of the hook bar (also referred to as a support bar, or end hook),
- page labeled (9) = an overall side view of the rack with an exemplary DVD player in place on the shelf of the rack, and
page labeled (10) = alternate embodiment of hook bars in tube (shown as transparent) that press outward against headrest posts, a drawing for an embodiment of the spacer bushing, and a drawing of a hook bar having anti-pivot means engaged with the posts of a headrest (top view).

It should be noted that the notes are chronologically organized and represent potentially different embodiments at different stages of the invention's development, all of which should be considered within the scope of the invention. It may be noted that the page label (1) drawing shows an earlier version of the hook bar, that is improved in the page label (8) drawings of the hook bar, especially with reference to the extension of the inward end, and the safety release design of the hook. The page label (9) and (10) drawings illustrate the most recent embodiment.

Summary of Features of Vehicle Seat Mount Equipment Rack

Ed Spellman 7/29/03, edited and expanded 7/30/03

RACK SYSTEM IN GENERAL

- Rack system is used to hold electronic equipment, i.e., portable DVD players, CD players, notebook computers, computerized game systems, PDAs, etc., between two adjacent adjustable height vehicle headrests (i.e., headrests that are supported on at least one round post).
- Rack system is comprised of: a telescoping means with an attached shelf means, and means of holding equipment to the shelf means. Preferred embodiment is a rigid, hollow support tube (square or rectangular), two hook bars sliding within the tube, and a shelf attached to the side of the tube. Alternate embodiments include but are not limited to: hollow hook bars sliding on an internal rod, hook bars with ridges sliding in grooves of an adjacent support bar, hooks at ends of telescoping tubes, etc.
- Rack system could also have a means to load the hook bars against the headrest posts, e.g. via tension spring(s), e.g., via set screw. This will allow rack system to be easily installed in and removed from virtually any vehicle that has 2 adjacent adjustable height headrests. Exemplary alternate embodiment - see page label (10) - is compression spring means for pushing the hook bars apart, and a notch (e.g., an outward opening Vee) on the end of each hook bar.
- Rack system could also have electrical wiring strain relief clips or other strain relief provisions attached to or built into the support tube and/or shelf.
- Rack system could also have built in compartments or pockets for various items such as: remote controllers, DVDs, patch cords, head phones, etc.
- Rack system could also have accessory items such as: headrest post spacer bushings to help steady the rack when one or both headrests are extended up, and elastic cords that extend between the bottom front of the shelf to the bottom of the seats and/or center console. These accessories will help to stabilize the rack system when transversing rough roads or terrain. The headrest post spacer bushing could be a compressible foam hollow tube with a slit (e.g., longitudinal or

helical) so that it can be easily fitted coaxially onto the headrest post above the hook bar, thereby filling the space between the hook bar and the raised headrest and thus pressing down on the hook bar.

SHELF

- Shelf can have a non-skid texture, coating, laminate, or covering (e.g., rubber mat) to help prevent movement of the mounted equipment.
- Shelf has one or more back stops. Back stops can be moved and repositioned to avoid interference with switches, connectors, jacks, etc. that may be on the back of the mounted equipment. Back stops can be covered with a resilient material to prevent marking of the mounted equipment.
- Equipment is secured to the shelf via easy to remove or unlatch hold-down means including: elastic cord(s), belt(s), clip(s), or suction cup(s), etc.. Ease of equipment installation and removal is important in order to encourage safe storage of equipment when unattended, i.e., theft protection.

SUPPORT TUBE

- Support tube keeps the hook bars in axial alignment, supports the shelf, holds the hook bar stop pins, and prevents rotation of the shelf (e.g., tube has rectangular cross-section and is close-fitting around rectangular cross-section hook bars).
- Provides means to limit lateral sliding of tube/shelf. Limiting means include, for example, set screw, shim spring, indented portion of tube wall, angled tube wall and other means to cause friction between tube and at least one of the hook bars.

HOOK BARS

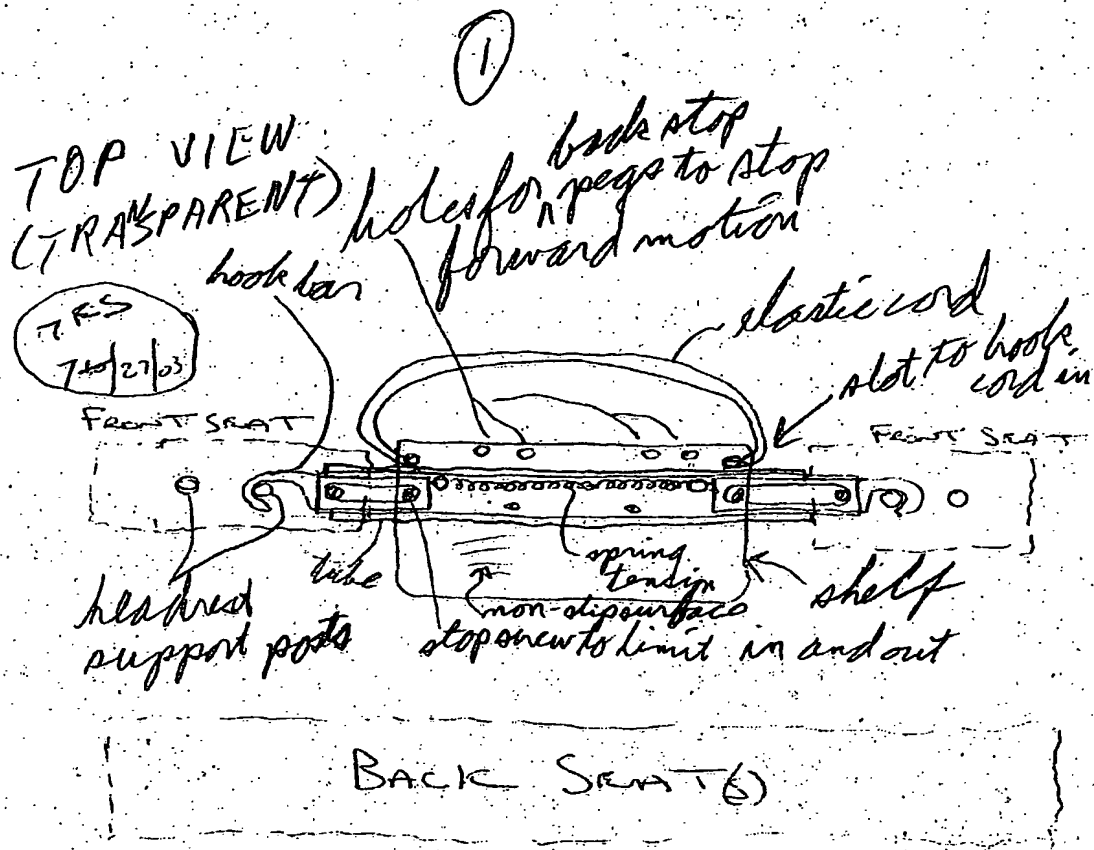
- Hook bars have stop ribs to prevent excessive extension or retraction. These ribs contact the stop pins to limit hook bar travel.
- Hook bars have an extended inner end to provide a bearing surface for adequate rack rigidity when hook bars are fully extended (up to stop pins).
- Hook bars have disengagement means to allow the rack to disengage from the headrest posts if the rack is hit from behind with sufficient force. This is a rear seat passenger safety feature. Preferred embodiment of hook bar has a ramp-out

hook profile and the hook portion of each hook bar opens rearward relative to the vehicle. Preferably there is also anti-pivot means to prevent the rack system from disengaging from only one post and then swinging around the other post to hit a passenger in the front seat. For example, a lanyard could limit such pivoting travel. For example, the hook bar could extend beyond the hook on the near post to rest in front of the far post of the headrest - see drawing on page label (10).

Break-apart means could also be incorporated in any of these designs.

- Hook bars have a spring pocket to allow for the use of a longer spring. This allows for a large extension range while keeping the spring stresses low.
- Extension spring is attached to the hook bars via a metal pin, preferably at the lateral center (on the central axis) of the hook bar, or at least near the center of the pin. This spreads out, and therefore reduces, spring loading on the bar which may be plastic. This may be important when the rack is fully extended in a hot vehicle.

***NOTE: SPECIFICATION CONTINUES ON PHOTOCOPIES OF UNTYPED PAGES
WITH SKETCHES AND ONE PROFESSIONAL DRAWING***



2 hook bars slide in rectangular hollow tube, linked by tension spring.
Tube is affixed to bottom of track.

②

Center distance Fully retracted $\rightarrow 18\frac{1}{2}"$

Center Distance Fully extended $\rightarrow 27\frac{1}{2}"$

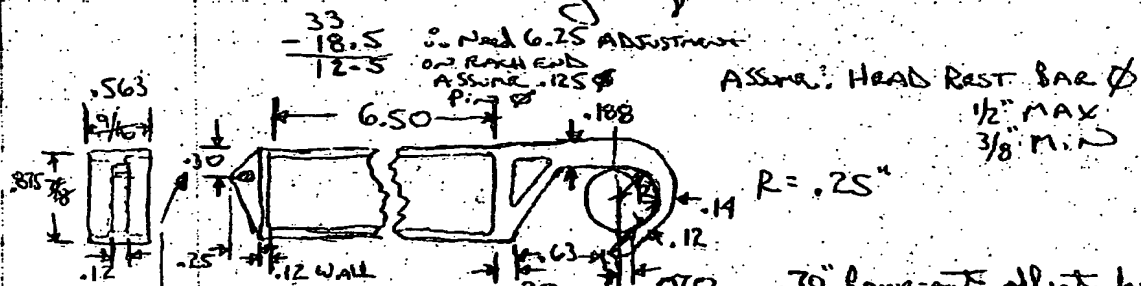
Total \Rightarrow 96 Audi A4, 2000 Terrans,
2001 Waudster Van, 2001

4" too short for 99 Honda Odyssey Van

∴ Add $5\frac{1}{2}"$ to Center distance extended

∴ Center distance fully extended needs to be 33"

Have to extend 3" for Audi 50. Can ~~not~~ ^{increase} retracted center distance by 1" if needed



ASSUR: HEAD REST BAR ϕ
1/2" MAX
3/8" MIN

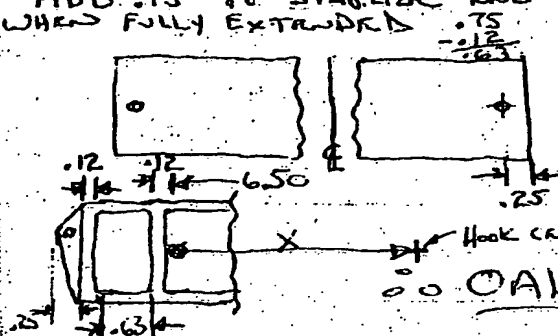
$$R = .25''$$

EXTENSION SPRING $\rightarrow .75" \text{ O.D.}$

$\frac{.875}{.500}$
 2) $.375 = .187$ Extension SPRING $\rightarrow .25" \text{ O.D.}$
 OAL of end hook = $.25 + .12 + 6.50 + .30$
 $+ .63 + .25 + .063$
 $+ .14 = 8.253$

70" hang-out affects from
center is no clip will
release if hit by back
seat passenger

ADD .75" TO STABILIZER END
WHEN FULLY EXTENDED .75"


$$X = 6.50 + .10 + .63 + .063$$
$$X = 7.493 \text{ average } 125d$$

7-478-063=
7.430

(3)

Distance From end of Support Tube to Center of hook with hook Fully extended is 7.430"

$$33 - (7.43)2 = 18.14 + 2(.25)$$

$$\text{Length of Support Tube} = 18.14 + 2(.25) = \underline{18.64"}$$

$$\text{Distance from Pin Step to Center of Hook when fully retracted} = .063 + .30 + .63 + .063 = \underline{1.055}$$

$$\text{Distance from end of Support Tube to Center of hook when fully retracted} = 1.055 - .25 = \underline{.805}$$

$$\text{Center Distances Between Hooks when Fully retracted} = 18.64 + 2(.805) = \underline{20.25"}$$

$$20.25 - 18.50 = 1.75" \Rightarrow \text{more than the 1" I was aiming for but OK}$$

∴ This Size increases Fully retracted Center Distance by 1.75" This is OK.

* → This New Design will have hooks that extend From 20 1/2" To 33" Center Distance

Calculate Spring Length

$$\text{Distance From Center of hook to end of Part (end hook)} = 9.00 - .25 - .14 = 8.61"$$

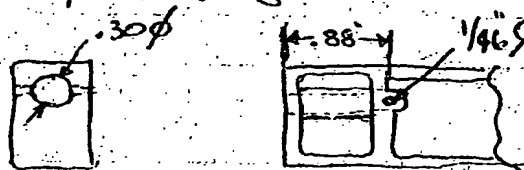
$$\text{Distance between 2 ends when Fully retracted} = 20 \frac{1}{2} - 2(8.61) = 3.28$$

∴ Make Distance Between Spring Hook 3.13". This will allow for some initial spring extension to eliminate rattles. Current Prototype Spring is 4 1/2" long.

(4)

Can a Spring be found that has a 3.13" free length that can extend to 15.63" ($33 - 20.5\frac{1}{2} + 3.13$) without being overstressed?

IF NOT put a slot in the end hook Tooling to make a Pocket for the spring and add a $\frac{1}{16}$ " Holes for Spring Retention Pins



$$\text{Distance from end to Spring retention Pin} = .12 + .63 + .12 = .88$$

This also has the advantage of removing .25" from the end of each piece.

$$\therefore \text{New Spring Length} = 3.13 + 2(.25) + 2(.88) = 5.39$$

\therefore Spring needs to be able to extend from a Free length of 5.39 To 17.89"

$$\text{Total extension} = 17.89 - 5.39 = 12.5"$$

Current Spring extends a Total of 9.0"

Current Spring is 4.5" long

$$\therefore \text{extension ratio} = \frac{9.0}{4.5} = 2$$

New Spring need to extend 12.5"

New Spring is 5.39" long

$$\therefore \text{extension ratio} = \frac{12.5}{5.39} = 2.3$$

* \rightarrow This should be OK but check Spring Stress

(5)

Note: Patent # 6,374,040 Dated April 16 2002 was
granted to Toshiba for "Portable DVD Player"
This Patent was filed Dec 19 2000

- # 6,330,377 "Automotive entertainment system for
rear seated passengers"

- 2) "Portable DVD Player Shelf" → 0
- 3) "Portable DVD Player Case" → 0
- 4) "Portable DVD Player Rack" → 0
- 5) "Portable DVD Player Support" → 0

Checked for Registered Patent Attorneys in Cleveland
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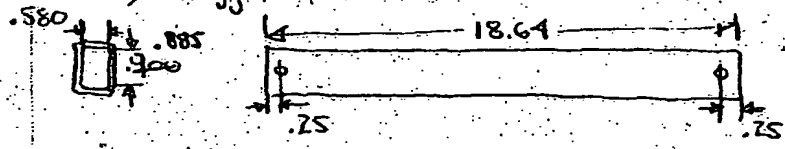
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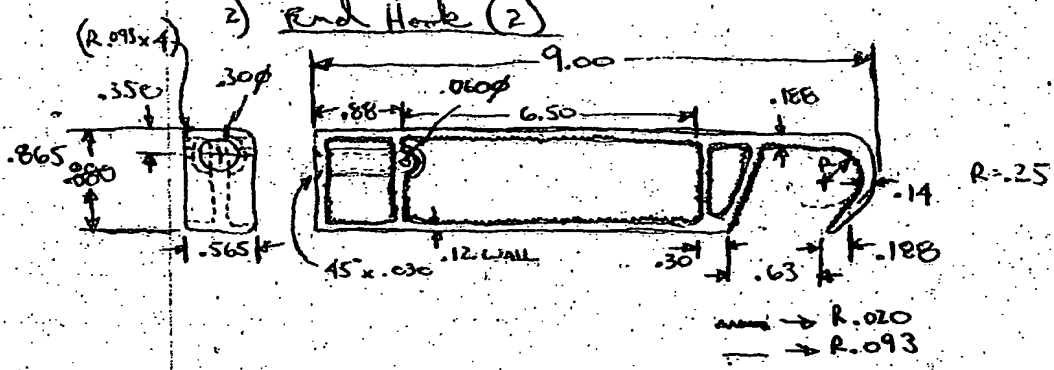
⑥

Summary of new design: Range 20 1/4 to 33

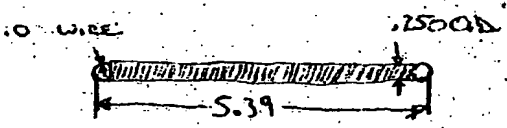
1) Support Tube (1)



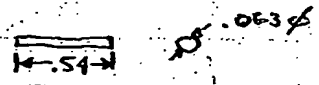
2) End Hook (2)



3) SPRING (1)



4) SPRING RETENTION PINS (2)

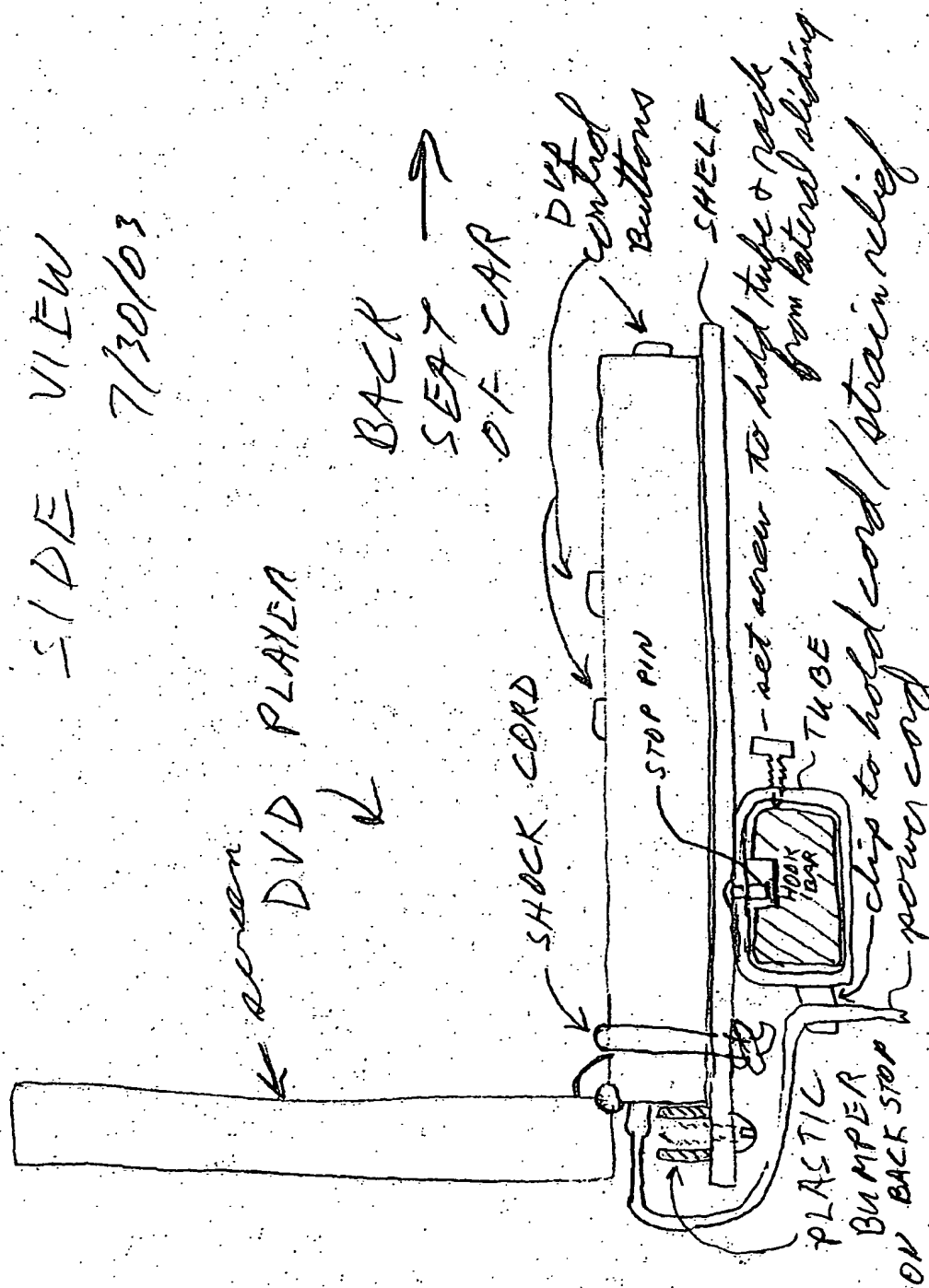


(7)

7/28/03 Spoke to Jack Katilins at Rock Molding. I described the
Kud hook to him. His suggestions were:

- ABS (\approx 70/1b), used in alot of automotive interior applications
 - Aluminum Tool is good for 25-30,000 Parts
 - Done in a small (28 Ton) press
 - Use local small shop, Cleveland has lots of them
- He suggested I try to reach BERNIE SCHAUER
(216) 397-1246

SIDE VIEW
7/30/03



Alternates to set screw: shim spring or friction device between bar & tube inner wall, indented portion of tube wall to give friction, etc

page 14/14

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